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NOTES ON THE PSYCHOMYIDAE (TRICHOPTERA) FROM THE AFRICAN MAINLAND (SOUTH OF THE MEDITERRANEAN REGION), WITH PARTICULAR REFERENCE TO THE GENERA *ECNOMUS* AND *PSYCHOMYIELLODES*.

By D. E. Kimmins.

Department of Entomology, British Museum (Natural History).

Manuscript received 6th March, 1957.

(Read 1st May, 1957).

With 5 Text-figures.

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1. Introduction.

This paper may be regarded as supplementary to my paper on the African Leptocerinae (Kimmins, 1956), in as much as it deals primarily with another part of the collections made by Dr. Norman E. Hickin during his visit to the laboratories of the East African Fisheries Research Organisation at Jinja, Uganda, in May and June, 1954, and by Dr. Philip S. Corbet, of the same organisation. The bulk of the material dealt with here belongs to the genus *Ecnomus*, of which there appears to be no end to the number of species in Africa. A key to the subfamilies and genera of the African Psychomyidae and also one to the recorded African species of *Ecnomus* are given and a list of the recorded African Psychomyidae, with references, is included.

The author again wishes to express to Drs. Hickin and Corbet his appreciation of their kindness in presenting to the British Museum (Natural History) the types of all new species and much other material.

In Mosely and Kimmins (1953) I ventured to put forward alternative characters by which to separate the Ecnominae from the Psychomyinae, the characters originally proposed by Ulmer and later by Lestage having proved somewhat unreliable. One of the characters which I then used has, when applied to a wider fauna, also broken down, or at least proved difficult at times to interpret. I refer to the forked condition of R_1 at its apex in the fore wing. In *Ecnomodes*, which in other respects is a typical Ecnomine, this vein is figured as simple. It is possible that it is very indistinct and has been overlooked. Such has proved to be the case in the typical species of *Ecnomiella* and *Psychomyiellodes* Mosely. In *Ecnomina* Kimmins, R_2 and R_3 remain fused throughout their length in the fore wing and in *Psychomyiellodes* they may be either fused

or separated. I have, therefore, tried to find another character to act as a check when the forked condition of R_1 is in doubt. Tibial spurs, number of apical forks in the hind wing, presence or absence of discoidal cell in the hind wing were of no help but, with the possible exception of two genera about which I lack the necessary information, the presence of a corneous (or facetic) point in the apical fork R_4 in the hind wing seems always to be accompanied by an unforked condition of R_1 in the fore wing of the Psychomyinae. The absence of such a point in fork R_4 in the hind wing is *generally* accompanied by a forked R_1 in the fore wing in the Ecnominae. The two doubtful genera (not African) are *Kibuneopsychomyia* Tsuda and *Austrotinodes* Schmid; the figured venation for these two genera shows no corneous point in either wing, but in the papers concerned neither author has figured the corneous point in any genus. Incidentally, *Austrotinodes* Schmid (S. America) appears to be fairly closely related to *Ecnomina* Kimmins (Australia) in wing venation, and as it is shown with a very definitely forked R_1 in the fore wing, it should be transferred to the Ecnominae. The following modified characters are therefore suggested for the recent genera of the subfamilies Ecnominae and Psychomyinae.

Ecnominae. (Fig. 1, c–f).

Spurs 3.4.4 or 2.4.4. In fore wing, R_1 is usually forked at apex (fork sometimes obscure, or in *Ecnomodes* figured as absent.) In hind wing, corneous point absent from apical fork R_4. In fore wing, fork R_2 absent or present, forks R_4, M_1, M_2 and Cu_{1a} all present. In hind wing discoidal cell present or absent, forks R_4 and Cu_{1a} always present, fork M_1 absent or present.

Genera: *Austrotinodes* Schmid, *Ecnomina* Kimmins, *Ecnomodes* Ulmer, *Ecnomus* McLachlan (= *Ecnomiella* Mosely), *Parecnomina* Kimmins (in press) and *Psychomyiellodes* Mosely.

Psychomyinae. (Fig. 1, b).

Spurs 2.4.4 or 1.4.4. In fore wing, R_1 not forked at apex. In hind wing, corneous point present in apical fork R_4. In fore wing, forks R_2 absent, R_4 present, M_1, M_2 and Cu_{1a} present or absent. In hind wing, discoidal cell absent, forks R_2 absent, R_4 present, M_1 and Cu_{1a} present or absent.

Genera: *Abaria* Mosely, ?*Kibuneopsychomyia* Tsuda, *Lype* McLachlan, *Melanotrichia* Ulmer, *Metalype* McLachlan, *Psychomyia* Latreille, *Psychomyiella* Ulmer and *Tinodes* Curtis.

2. Key to the Genera of Psychomyidae of the African Mainland.

1 Maxillary palp 6-segmented, labial 4-segmented . . . . Paduniellinae (1 genus, **Paduniella** Ulmer)

– Maxillary palp 5-segmented, labial 3-segmented 2

2 R_1 in fore wing usually forked at apex. In hind wing, corneous point lacking in apical fork R_4 (fig. 1, c–f) . . . . . Ecnominae, 3

– R_1 in fore wing not forked. In hind wing, corneous point present in fork R_4 (fig. 1, b) . . . . . Psychomyinae (1 genus, **Lype** McLachlan)[1]

[1] The genus *Tinodes* has been recorded with a (?) by Navás from the Belgian Congo, on the evidence of a single female in poor condition. His figure and description are inadequate and the genus is omitted from this key.

3 In hind wing, apical fork M_1 present, discoidal cell closed (fig. 1, F)
Parecnomina Kimmins (*in press*)

– In hind wing, apical fork M_1 absent, discoidal cell absent (fig. 1, C–E) 4

4 Male with a specialised spur, armed with a curved claw, at apex of tibia; cup-shaped genital appendages projecting through the lateral excisions of ninth segment, possibly attached to aedeagus (fig. 4)
Psychomyiellodes Mosely

– Male without such specialised spur or such cup-shaped genital appendages . . . . . **Ecnomus** McLachlan[2]

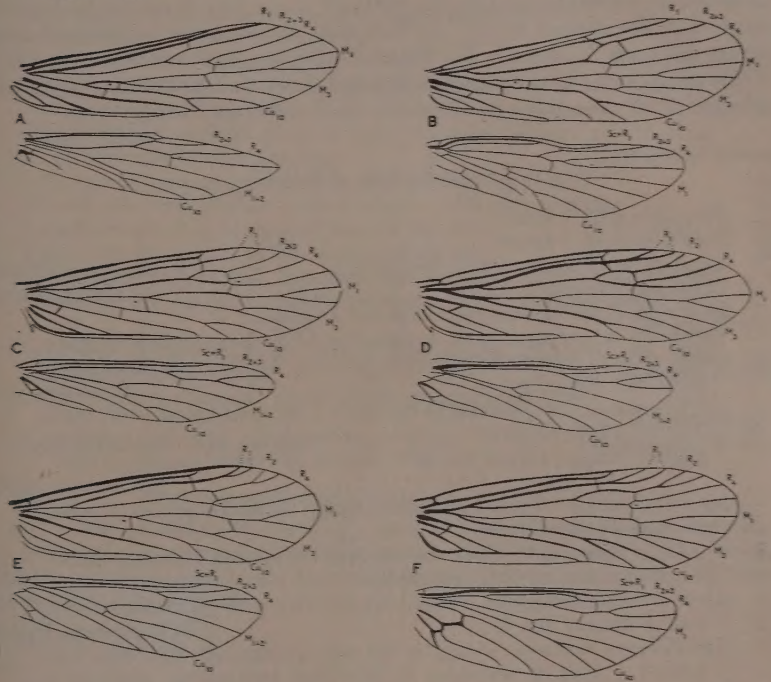

FIG. 1.—Wings of Psychomyidae. (A), *Paduniella ankya* Mosely; (B), *Lype afra* Mosely; (C), *Psychomyiellodes ungulata* Mosely; (D), *Psychomyiellodes obscura* sp. n.; (E), *Ecnomus natalensis* Ulmer; (F) *Parecnomina forcipata* Kimmins (*in press*).

3. DESCRIPTIONS OF SPECIES.

Ecnomus McLachlan.

Ecnomus McLachlan, 1864 : 30.

Type-species (monobasic) *Philopotamus tenellus* Rambur, 1842.

Ecnomiella Mosely, 1935 : 222 (**Syn. Nov.**).

Type-species (monobasic) *Ecnomiella bifurcata* Mosely, 1935.

[2] *Ecnomiella* Mosely is considered as a synonym of *Ecnomus*; R_1 has been found to be obscurely forked at apex in fore wing, the fore tibia has two spurs (a character also occurring in *Ecnomus*), leaving only the bifurcated lobes of the tenth segment, which I do not consider to be a sufficient generic character.

A distinct group of species related to *natalensis* Ulmer is distinguished by having only two tibial spurs on the fore leg, instead of the usual three and the clasper of the male abruptly constricted in side view, the upper angle being produced in a finger. In general appearance, the species of *Ecnomus* are very uniform and the males are by no means always easy to separate, even by an examination of the dried (or even the alcohol-preserved) genitalia, and it is frequently necessary to clear the abdomen in caustic potash solution in order to see the structure of the aedeagus sufficiently plainly. Barnard has figured the genitalia of some females but he writes " . . . but ♀♀ cannot be definitely assigned in the absence of ♂♂. In fact, they should never be assigned unless caught *in copula* ". Since in Dr. Hickin's collection no fewer than four species of this group were taken at Kagera Bay and three of them also at Jinja, I have refrained from attempting to determine the females specifically.

Key to African Species of *Ecnomus*, males.

1	Fore tibia with 2 spurs	2
–	Fore tibia with 3 spurs	10
2	Lobes of tenth segment each bifurcate	**E. bifurcatus** (Mosely)
–	Lobes not bifurcate	(**natalensis** group) 3
3	Titillators extending almost to apex of aedeagus	4
–	Titillators extending at most to only three-fourths from base to apex	8
4	Lobes of tenth segment in side-view tapering, leaf-like ; internal apical teeth pale (fig. 2, F)	**E. foliatus** sp. n.
–	Lobes more or less quadrate in side-view ; internal apical teeth black	5
5	Lobes of tenth segment elongate, rectangular, internal spiniform process slender, almost straight, parallel to ventral margin of lobe	**E. kivuensis** Marlier
–	Lobes less elongate, more rounded apically, spiniform process stouter, more or less upcurved	6
6	Apex of aedeagus bifid, from the side forming more or less acute plates. Ventral surface of aedeagus convex	7
–	Apex entire, aedeagus in ventral aspect with a deep, median, longitudinal furrow (fig. 2, K)	**E. kunenensis** Barnard
7	Apical finger of clasper elongate, the excision beneath it in side view narrow. Apex of aedeagus in side view forming an acute spine (fig. 2, N)	**E. natalensis** Ulmer
–	Apical finger shorter, slightly more down-curved, the excision beneath it widely rounded. Apex of aedeagus in side view forming a broad, acute triangle (fig. 2, U)	**E. ugandanus** sp. n.
8	Titillators about half as long as aedeagus, scarcely curved, toothed about mid-way	**E. nya** Mosely
–	Titillators less than half as long as aedeagus, strongly up-curved, bifid apically or toothed near apex	9
9	Clasper at base almost as deep as sternite, excision below apical finger shallow (fig. 2, T)	**E. thomasseti** Mosely
–	Clasper at base about half as deep as sternite, excision below apical finger deep, semi-circular (fig. 2, B)	**E. barnardi** sp. n.
10	Aedeagus with one or more pairs of titillators	11
—	Aedeagus without titillators	14
11	Aedeagus with one pair of titillators	12
—	Aedeagus with two pairs of titillators	**E. africanus** Mosely

12 Internal processes of tenth segment up-curved, ending in a tuft of bristles . . . . . **E. aequatorialis** Marlier
— Internal processes straight 13
13 Internal process terminating in 3 teeth . . . . . **E. ulmeri** Mosely
— Internal process terminating in a long, apical spine . **E. oppidanus** Barnard
14 Clasper not extending as far as apex of lobe of tenth segment . . 15
— Clasper extending as far as or beyond apex of lobe 18
15 Lobe of tenth segment from side slightly tapered and sinuous (fig. 3, C) **E. concavus** sp. n.
— Lobe somewhat constricted basally, then slightly dilated 16
16 Lobe in side view rounded apically 17
— Lobe in side view truncate apically . . . . . **E. curtus** Mosely
17 Clasper with a large hump on upper surface at base; from beneath, clasper is gently tapered . . . . . **E. fuscus** sp. n.
— Clasper without definite hump at base; from beneath scarcely tapered but obliquely truncate at apex . . . . . **E. gerus** Mosely
18 Lobe in side view up-curved, tapering or blunt apically 19
— Lobe in side view slightly down-curved or obliquely truncate . . . 21
19 Lobe not extending to apex of clasper (fig. 3, D) . . **E. dispar** sp. n.
— Lobe extending about as far as apex of clasper 20
20 Lobe strongly up-curved, tapering, apex rounded; a median process between the curved, spiniform processes of the tenth segment **E. leonus** Mosely
— Lobe less up-curved, more parallel-sided, apex truncate; no such median process . . . . . **E. similis** Mosely
21 Lobe obliquely truncate, upper margin shorter than lower **E. complex** Mosely
— Lobe gradually down-curved . . . . . **E. hamatus** Mosely

Ecnomus natalensis Ulmer. (Figs. 1, E, 2, N).

Male: Distinguished by the moderately elongate lobes of the tenth segment, rounded apically in side view, the process slightly up-curved; the aedeagus bifid apically, forming a pair of plates set on edge, in side view comparatively slender, sinuous, acute; titillators long, slightly curved, spine-like.

Habitat: Natal.

Ecnomus ugandanus sp. n. (Fig. 2, U).

Ecnomus nya Kimmins (*nec* Mosely, 1948), 1953 : 274.

Uganda: L. Edward, vi.1949, a number of ♂ and ♀ (*R. H. Lowe*); L. Victoria, Kagera Bay, 18.v.1954, 1 ♂ (*N. E. Hickin*); Jinja, ix–x.1954, at light, 1 ♂ (*P. S. Corbet*); Entebbe, 28–30.iii.1956, 24 ♂ (*P. S. Corbet*).
Tanganyika: L. Victoria, Mwanza Pier, 11–13.viii.1956, 2 ♂ (*P. S. Corbet*).

Miss Lowe's material is in fluid and is much bleached. The following account of the general appearance has been made from the male from Jinja.

General colour of head and thorax pale fuscous, a patch of golden hairs on frons, pubescence elsewhere fuscous. Antennae (denuded) pale ochraceous. Palpi and legs ochraceous, with fuscous pubescence. Fore wing fuscous, with traces of yellowish irrorations. Abdomen reddish.

Male genitalia: Lobes of tenth segment in side view subquadrate, apex rounded,

blackened teeth confined to inner apical margin. Process of tenth segment about as long as lobe, directed obliquely downward and caudad, moderately broad, apex tapering and up-curved. Aedeagus with its stem constricted before mid-way, then the lateral margins are expanded and finally taper towards the apex. The latter is cleft vertically, forming a pair of broad, triangular plates with acute apices. Titillators extending nearly to apex of aedeagus, stout, spine-like and up-curved. Ninth segment with its apical ventral margin triangularly produced at its centre. Clasper a little less deep than the part of the segment

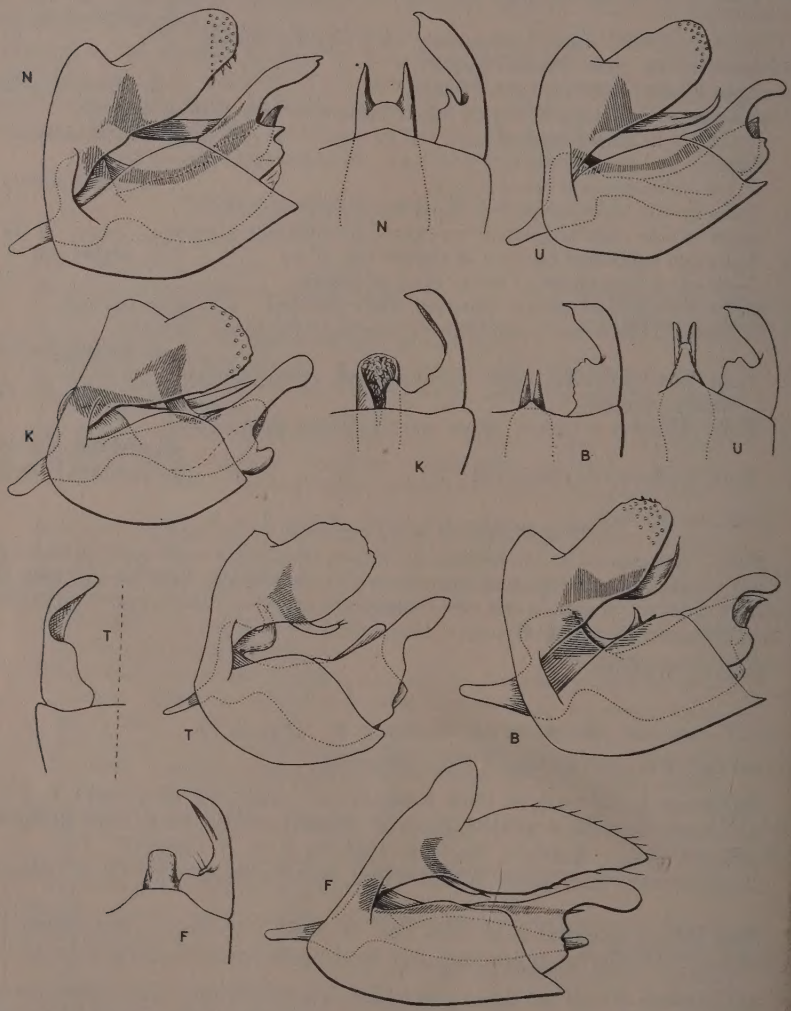

FIG. 2.—Male genitalia of *Ecnomus* (*natalensis* group), lateral, clasper and aedeagus, ventral. (B), *E. barnardi* sp. n; (F), *E. foliatus* sp. n.; (K), *E. kunenensis* Barnard; (N), *E. natalensis* Ulmer, paratype; (T), *E. thomasseti* Mosely, type; (U), *E. ugandanus* sp. n.

to which it is attached, its upper margin produced in a finger curving downward and inward in side view, with a wide, curved excision beneath it. From beneath the apical finger is rather broad and terminates in a small, acute beak.

Length of fore wing, 3·6 mm.

Holotype ♂ (Jinja, ix–x) in 2 per cent. formaldehyde solution, abdomen cleared, paratype ♂ (Kagera Bay) cleared and in glycerine, paratypes from L. Edward and Entebbe in 2 per cent. formaldehyde or alcohol, in Brit. Mus. (Nat. Hist.)

This species differs from *natalensis* in its slightly shorter and broader lobe of the tenth segment, with the internal black teeth more restricted to the apical margin. The terminal plates of the bifid apex of the aedeagus are much less acute in side view and the stem of the aedeagus is more broadened ventrally. The clasper is deeper basally, with the excision below the apical finger more widely rounded.

Ecnomus kunenensis Barnard. (Fig. 2, K).

Barnard, 1934 : 380, figs. 45, *m–q*.

Uganda : L. Victoria, Kagera Bay, 12.v.1954, 5 ♂, Jinja, 2–24.v.1954, 6 ♂ (*N. E. Hickin*) ; Jinja, 3.iii.1954, 5 ♂ (*P. S. Corbet*) ; Albert Nile, Pakwach, 26, 29.iv.1956, 4 ♂ (*P. S. Corbet*).

I have not seen any authentic material of this species and my identifications are based upon Barnard's figures. Dr. Barnard presented some paratypes to the British Museum (Nat. Hist.) but examination of the males after treatment with caustic potash has shown them to be of the form which he referred to as *E. thomasseti* ?, but which I am describing as a distinct species.

I consider the true *kunenensis* to be distinguished in the male by its rather short, truncate lobes of the tenth segment, long, slender, spiniform titillators, aedeagus strongly constricted mid-way, its apex not bifid but with the ventral surface with a deep median furrow. Clasper deep at base in side view, terminal finger rather stout, lower apical angle pronounced and rounded.

Habitat : SW. Africa, Uganda.

Ecnomus barnardi sp. n. (Fig. 2, B).

Ecnomus thomasseti ? Barnard, 1934 : 380, fig. 45, *c*.
Ecnomus kunenensis Barnard, 1934 : 380 (partim, ♂ paratypes in Brit. Mus. (Nat. Hist.)).

SW. Africa : Kunene River, Otjimbumbe, iii.1923, 2 ♂ (*K. H. Barnard, R. F. Lawrence*).

Body colour fulvous-brown, with golden hairs. Legs ochraceous. Fore wing pale brownish, speckled with whitish dots.

Genitalia : Lobes of tenth segment moderately elongate, apices irregularly rounded, internal black teeth rather dense. Process rather broad and up-curved. Aedeagus stout, moderately constricted mid-way, apex bifid, with a pair of broad, slightly hooked plates. Titillators short, up-curved, apex bidentate. Clasper at base only about two-thirds as deep as sternite, apical finger in side view down-curved, from beneath rather flattened, extreme apex with a small, acute beak. Excision beneath apical finger large, semi-circular.

Length of fore wing, 3·5 mm.

Holotype ♂, pinned, with genitalia mounted as microscope preparation, paratype ♂, pinned, with abdomen cleared and in glycerine.

This species differs from *kunenensis* in the short, strongly curved titillators, the bifid apex of the aedeagus and differently shaped claspers. From *natalensis* it differs in the rather broader process of the tenth segment, the shorter, up-curved titillators and the shorter apical finger of the clasper. It would be unwise to give an opinion as to the identity of the female paratypes of *E. kunenensis* in our collection until the females have been correctly associated with the males.

Ecnomus thomasseti Mosely. (Fig. 2, T).

UGANDA: L. Victoria, Kagera Bay, 12.v.1954, 1 ♂, Jinja, 2.v–1.vi.1954, 5 ♂ (*N. E. Hickin*); Entebbe, 28–30.iii.1956, at light, 8 ♂ (*P. S. Corbet*).

TANGANYIKA: L. Victoria, Mwanza Pier, 11–13.viii.1956, 1 ♂ (*P. S. Corbet*).

These specimens differ slightly from the type in the relatively larger titillators, but I do not consider them to be anything more than a variation. *E. thomasseti* may be distinguished by the short, strongly up-curved titillators and deep claspers, which are much less excised beneath the apical finger than in the fore-going species.

Ecnomus foliatus sp. n. (Fig. 2, F).

UGANDA: L. Victoria, Kagera Bay, 18.v.1954, 1 ♂ (*N. E. Hickin*); Entebbe, 28–30.iii.1956, at light, 1 ♂ (*P. S. Corbet*).

Head and thorax medium fuscous, with fuscous and golden hairs. Antenna ochraceous, annulated with fuscous. Palpi fuscous. Legs ochraceous, tibiae externally and tarsi annulated with fuscous. Fore wing fuscous, with ochraceous irrorations.

Genitalia: Tenth segment produced in two elongate, leaf-shaped lobes, armed internally at apex with pale teeth. Process rather short. Titillators long, slender, spiniform. Aedeagus rather more slender than in the fore-going species, apex not bifid. Clasper about three-fourths as deep as sternite, apical finger fairly short in side view, incurved and acute in ventral view. Excision below apical finger rather wide.

Length of fore wing, 3·6 mm.

Holotype ♂ pinned, abdomen cleared and in glycerine, paratype ♂ cleared and in 2 per cent. formaldehyde solution.

This species differs from the others in the group in its leaf-shaped, tapering lobes of the tenth segment, with pale apical teeth and the more slender aedeagus.

Ecnomus ulmeri Mosely.

UGANDA: L. Victoria, Kagera Bay, 12–18.v.1954, 10 ♂ (*N. E. Hickin*); Jinja, 3.iii.1954, 3 ♂, ix-x.1954, at light, 2 ♂, L. Victoria, Lolui Island, 8.xii.1954, 1 ♂ (*P. S. Corbet*); Jinja, 2–8.v.1954, 5 ♂ (*N. E. Hickin*); Entebbe, 28–30.iii.1956, 12 ♂ (*P. S. Corbet*).

KENYA: L. Victoria, Kisumu, 24.i.1955, 5 ♂, 5 ♀ (*P. S. Corbet*).

GOLD COAST: Volta River, Senchi, 31.vii–2.viii.1950, 17 ♂, 5 ♀ (*L. Berner*).

Previously recorded from SIERRA LEONE.

Ecnomus complex Mosely.

Uganda: Butiaba district, iii.1954, 6 ♂; Albert Nile, Pakwach, 26, 29.iv.1956, 314 ♂ (*P. S. Corbet*).

Previously recorded from Sierra Leone.

Ecnomus leonus Mosely.

Gold Coast: Afram River, Mankrong, 13.ix.1950, 1 ♂ (*L. Berner*).

Previously recorded from Sierra Leone.

Ecnomus dispar sp. n. (Fig. 3, D).

Uganda: Entebbe, 28–30.iii.1956, at light, 10 ♂; Albert Nile, Pakwach, 26.iv.1956, 4 ♂ (*P. S. Corbet*).

General appearance much as in other species of the genus. Spurs 3.4.4.

Genitalia: Tenth segment only about as long as produced lower part of ninth segment, bilobed, each lobe from the side stout at base, tapering to a rounded, up-curved apex. From above slightly incurved, more or less parallel-sided, apex blunt, armed on its inner surface with a number of stout, socketed teeth. Near the base arises a pair of curved spines, directed downward and tailward, one on each side of the aedeagus. The latter is stout, tapering to a slender, curved, finger-like apex; no titillators. Clasper about as long as ninth segment, extending well beyond the tenth segment; slightly tapering from the side, from beneath broad at base, tapering to an up-curved, rounded apex, armed with bristles.

Length of fore wing, 3·7 mm.

Holotype ♂ (mounted as a microscope preparation), paratypes in Brit. Mus. (Nat. Hist.) These specimens were part of a mixed tube of *Ecnomus* spp. taken at light, and in order to sort them out with any certainty, they were all treated with caustic potash solution.

This species resembles *E. complex* and *E. similis* Mosely in spur formula and genital structure, but may be distinguished from them by the relatively shorter lobes of the tenth segment, which are only about as long as the ninth segment. *E. africanus* Mosely has a rather short tenth segment, but in this species the aedeagus carries two pairs of titillators.

Ecnomus concavus sp. n. (Fig. 3, C).

Uganda: Entebbe, 28–30.iii.1956, at light, 20 ♂ (*P. S. Corbet*).

Collected into alcohol, general appearance much as in other species of the genus. Spurs 3.4.4.

Genitalia: Tenth segment more than twice as long as produced lower part of ninth segment, extending beyond the claspers, each lobe from the side only moderately broad at base, slightly sinuous and tapering to a rounded, down-curved apex. From above, calliper-shaped, inner surface at apex armed with a patch of stout, socketed teeth. On inner surface at base arises a short, transparent, setiferous process. Between the lobes and apparently arising near the apical margin of the ninth segment is a pair of sinuously curved spines, directed downward and then tailward, apices one on each side of aedeagus. The latter tapers from about mid-way to a narrow, down-curved, digitate apex. Clasper about as long as lower part of ninth segment, ovate in side view, upper and lower margins incurved, inner surface concave. Upper margin armed with a number of stout setae. From beneath

the clasper is broad basally, inner margins approximated, somewhat triangular.
Length of fore wing, 4·4 mm.

Holotype ♂ (mounted as microscope preparation), ♂ paratypes in Brit. Mus. (Nat. Hist.). Specimens collected with *E. dispar* at light.

E. concavus differs from *E. hamatus* Mosely (Sierra Leone) in its narrower, more sinuous and relatively longer tenth segment, stouter spiniform processes and broader claspers, more ovate in side view, more triangular from beneath.

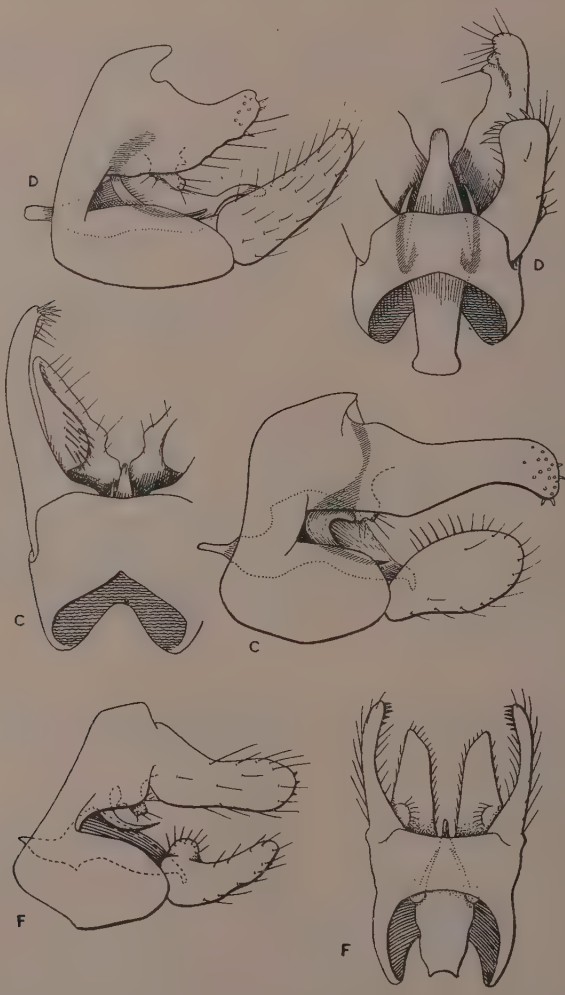

Fig. 3.—Male genitalia of (D), *Ecnomus dispar* sp. n., (C), *E. concavus* sp. n., and (F), *E. fuscus* sp. n., lateral and dorsal.

Ecnomus fuscus sp. n. (Fig. 3, F).

TANGANYIKA : L. Tanganyika, Kigoma, 16.viii.1956, 6 ♂, 4 ♀ (*P. S. Corbet*).

(In alcohol). Tibial spurs 3.4.4. Head and thorax light fuscous above, antennae, legs and abdomen ochraceous. Wings fuscous.

Male genitalia : Lobes of tenth segment elongate, slightly sinuous, and with rounded apices from side, slender and incurving from above, inner apical surface armed with teeth. At its base each lobe carries a short, transparent, bifid, setiferous process. Spiniform processes short, gently up-curved. Aedeagus apparently without titillators, moderately broad, tapering to a down-curved apex. Clasper not extending as far as apex of tenth segment, from the side slightly up-curved, with a rounded hump on the upper margin at the base ; from above moderately broad at base, tapering to narrow obliquely truncate apices.

Length of fore wing, 5·00 mm.

Holotype ♂ (mounted as microscope preparations) and ♂ paratypes in Brit. Mus. (Nat. Hist.).

This species is related to *E. gerus* Mosely from Sierra Leone, but differs chiefly in the bifid setiferous process of the tenth segment, and in the clasper, which is relatively larger, less tapered in side view, and more tapered in dorsal view, the truncate portion being smaller.

Psychomyiellodes Mosely. (Figs. 1, C–D ; 4).

The description of this genus was based upon a single male from Sierra Leone, and Mosely subsequently received another male from the same area. Later he transferred to this genus *Ecnomus tropicus* Ulmer, a species with similarly constructed male genitalia and also possessing a modified apical spur on the hind tibia. Two other species have now come to hand, from Uganda, Rhodesia and Tanganyika. The male genitalia show the same curious cup-shaped structure as in the other two species, but I was surprised to note that in the fore wing R_1 was clearly forked at its apex, a character associated with the Ecnominae. There are also three spurs on the fore tibia, not two as found in the other two species.

I therefore re-examined these other species and found indications at least of a similar fork of R_1 in both of them, this fork being least distinct in the type species. In some cases, the anterior branch of the fork could not be seen by transmitted light in the denuded wing, but was revealed by suitably directed reflected light. In view of the forked R_1 in the fore wing, I have transferred the genus *Psychomyiellodes* from the Psychomyinae to the Ecnominae and have extended the generic character as follows :

Spurs 2.4.4 or 3.4.4, inner apical spur of male hind tibia specialised, bearing a curved apical or sub-apical claw. Fore wing with R_1 more or less clearly forked at its apex (sometimes only visible in a denuded wing with oblique top-light), apical fork R_2 present or absent, forks R_4, M_1, M_3 and Cu_{1a} all present, median and discoidal cells closed. In hind wing *Sc* and R_1 more or less fused, apical forks R_4 and Cu_{1a} only present, corneous point absent from fork R_4.

Key to African species of *Psychomyiellodes*, males.

1	Claspers elongate, apices curved upwards and inwards .	**P. tropica** (Ulmer)
–	Claspers short, apices not curved upwards and inwards	2

2 Lobes of tenth segment from above somewhat calliper-like
P. ungulata Mosely
– Lobes of tenth segment from above parallel 3
3 Lobes blunt at apex from above : clasper from beneath broadly quadrate, inner margin only slightly concave . . . . **P. obscura** sp. n.
– Lobes tapering to apex : clasper from beneath incurved, inner margin strongly concave . . . . . **P. dentata** sp. n.

Psychomyiellodes obscura sp. n. (Figs. 1, D ; 4).

Uganda : Jinja, 2.v.1954, 2 ♀ (*N. E. Hickin*), ix–x.1954, 1 ♂ (*P. S. Corbet*) ; Entebbe, 28–30.iii.1956, 13 ♀ (*P. S. Corbet*) ; Albert Nile, Pakwach, 26–29.iv.1956, 1 ♂ (*P. S. Corbet*).

Rhodesia : Victoria Falls, i.1956, 2 ♂ (*E. Pinhey*).

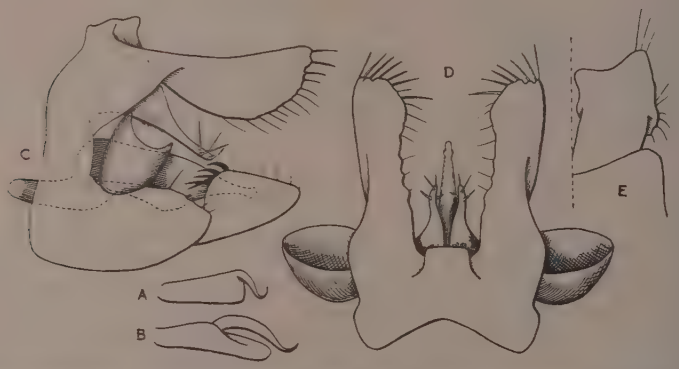

Fig. 4.—*Psychomyiellodes obscura* sp. n., male (A, B), specialised spur of hind tibia, two forms ; (C), genitalia, lateral ; (D), dorsal ; (E), right clasper, ventral.

Male (in 70 per cent. alcohol). Head fuscous, antenna with basal segment fuscous, remainder ochraceous. Pronotum fuscous, meso- and metanota reddish fuscous, legs pale fuscous. Specialised spur on hind tibia may be of one of two types. One is rather short with an almost apical curved spine and in the other the spine arises just beyond half-way along the spur. I can see no appreciable difference in the male genitalia of the the two forms. Fore wing dark fuscous, probably with dense fuscous pubescence, hind wing a little paler. Venation substantially as in *P. tropica* (Ulmer), that is, with apical fork R_2 present and R_1 forked.

Genitalia following closely the generic pattern. Ninth segment with a deep lateral excision. Dorsal apical margin produced in a small quadrate lobe, tenth segment deeply excised at its centre to form two long, spatulate processes, concave on their inner surfaces. From the side, each process has its upper margin almost straight, lower convex and fringed with setae. From above, the inner margin is finely irregular. At the base of each process on its inner surface arises a tapering finger with a stout base, hairy beneath and bearing at its apex 3 or 4 stout bristles. Aedeagus moderately stout in side view, tapering to a truncate apex. Projecting from the lateral excision of the ninth segment on each side is a thin, sclerotised cup or scoop-like structure. Ulmer has suggested that these are attached to the basal segment of the " Genitalfusse " (claspers) and Mosely that they may represent " intermediate appendages ". In the present species they appear to be attached by a

membranous stem to the aedeagus and I consider them to be a modification of the titillators or penis-sheaths. Clasper single-segmented, from the side short, triangular, the upper basal angle armed with a number of stout, recurved bristles. From beneath, the clasper is roughly quadrate or slightly rhomboidal, apical margin gently concave, inner margin sinuous and a little produced upwards.

Length of fore wing, 4 mm.

Holotype ♂ (Jinja, ix–x.1954) in 2 per cent. formaldehyde solution, one pair of wings mounted dry, genitalia mounted in euparal as microscope preparation, ♂ paratypes (partly cleared) in 2 per cent. formaldehyde solution, in Brit. Mus. (Nat. Hist.) and National Museum of S. Rhodesia collections.

This species differs from *P. ungulata* Mosely in the presence of apical fork R_2 in the fore wing, the less curved outer branches of the tenth segment and the longer, more quadrate claspers, as seen from beneath. It has the wing venation of *P. tropica* (Ulmer), but in this species the clasper is more elongate, with an up-turned, rounded apex in side view, and the outer lobes of the tenth segment are more acute in side view.

Psychomyiellodes dentata sp. n. (Fig. 5).

TANGANYIKA : L. Victoria, Mwanza Pier, 11–13.viii.1956, 1 ♂ (*P. S. Corbet*).

Male (in alcohol) : General appearance much as in *P. obscura*, claw of hind tibial spur apical.

Genitalia closely following the pattern of that species but differing in the following details : Dorsal apical margin of ninth segment produced in a triangular lobe. Spatulate processes of tenth segment from the side with apices more rounded, margins strongly dentate, the " teeth " armed with setae. From above the processes taper more towards the apices. Clasper from side with a small finger-like projection at apex, bristles at base of clasper weaker. From beneath, the clasper has a more or less convex apical margin, inner margin concave, outer strongly convex.

Length of fore wing, ♂, 5 mm.

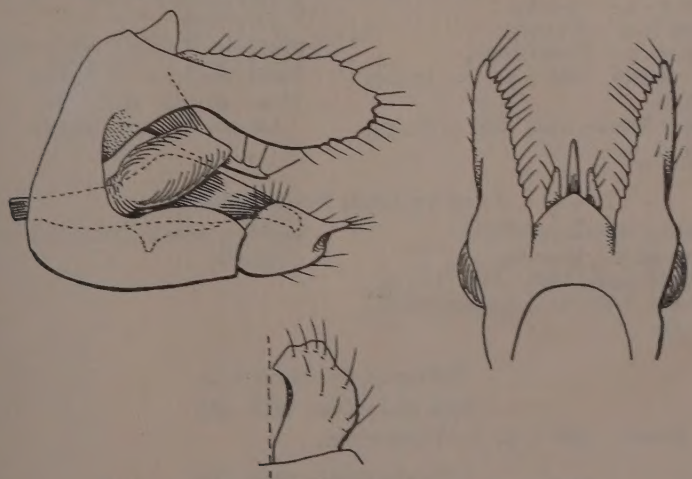

FIG. 5.—*Psychomyiellodes dentata* sp. n., male, genitalia, lateral, dorsal and right clasper, ventral.

Holotype ♂ (in 2 per cent. formaldehyde solution, abdomen mounted as a microscope preparation), in British Museum (Nat. Hist.).

4. List of Recorded Species of the African Psychomyidae.

Subfamily Paduniellinae.

Paduniella Ulmer, 1913 : 80.

africana (Ulmer), 1922 : 52 ; Mosely, 1936 : 444 — Cameroons, Sierra Leone.

ankya Mosely, 1939 : 29—Ruwenzori.

capensis Barnard, 1940 : 655 — S. Africa.

Subfamily Ecnominae.

Parecnomina Kimmins (*in press*).

forcipata Kimmins (*in press*)—Ruwenzori.

Ecnomus McLachlan, 1864 : 30.

(= *Ecnomiella* Mosely, 1935 : 222 (Syn. nov.).

aequatorialis Marlier, 1943 : 68 —Belgian Congo.

africanus Mosely, 1932 : 13 — Sierra Leone.

barnardi sp. n.—S. Africa, Rhodesia.

bifurcatus (Mosely), 1935 : 222 — Sierra Leone.

complex Mosely, 1932 : 11 — Sierra Leone, Uganda.

concavus sp. n.—Uganda.

curtus Mosely, 1932 : 10 — Ivory Coast.

dispar sp. n.—Uganda.

foliatus sp. n.—Uganda.

fuscus sp. n.—Tanganyika.

gerus Mosely, 1936 : 441 — Sierra Leone.

hamatus Mosely, 1935 : 225 — Sierra Leone.

kivuensis Marlier, 1943*a* : 25—Belgian Congo.

kunenensis Barnard, 1934 : 380 — S. Africa.

leonus Mosely, 1936 : 442 — Sierra Leone, Ghana.

natalensis Ulmer, 1931 : 12 ; Mosely, 1932 : 15—Natal.

nya Mosely, 1948 : 42—Nyasaland.

oppidanus Barnard, 1934 : 378 — S. Africa.

similis Mosely, 1932 : 12 — Cape Province.

thomasseti Mosely, 1932 : 15 — Natal.

ugandanus sp. n.—Uganda.

ulmeri Mosely, 1932 : 14 — Sierra Leone, Uganda, Ghana.

Psychomyiellodes Mosely, 1931 : 547.

dentata sp. n.—Tanganyika.

obscura sp. n.—Uganda.

tropica (Ulmer), 1905 : 35, 1912 : 90 ; Mosely, 1936 : 446—Congo, Sierra Leone.

ungulata Mosely, 1931 : 549 — Sierra Leone.

Subfamily Psychomyinae.

Lype McLachlan, 1878 : 423.

afra Mosely, 1939 : 28 — Ruwenzori.

? *Tinodes* Curtis, 1834 : 216.

annulata Navás, 1930 : 328 — Belgian Congo.

5. SUMMARY.

This paper is based mainly on material collected in Uganda by Drs. N. E. Hickin and P. S. Corbet. In all, eight new species are described, some new synonymy is proposed and the characters separating the Psychomyinae and the Ecnominae are discussed ; keys to the genera of the Psychomyidae and to the species of the genera *Economus* and *Psychomyiellodes* of the region are given.

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